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Patent
Attorney's Docket No. 031862-038

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	)	
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Miguel A. CAPOTE, et al.	)	
	)	
Application No.:	)	Group Art Unit:
	)	
Filed: August 17, 2001	)	Examiner:
	)	
For: SEMICONDUCTOR FLIP CHIP ASSEMBLY WITH PRE-APPLIED ENCAPSULATING LAYERS	)	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Applicants request that the following preliminary amendment be considered prior to examination on the merits.

In the specification, on pages 11 and 12 please replace the paragraph bridging these pages with the following:

In yet another embodiment (FIG. 5), the circuitry on the bottom surface 16 of the chip 10 is coated with the encapsulant 22, comprised of an adhesive 19 (such as a high temperature thermoplastic adhesive) and a film 21 (FIG. 12), then the contact pads 24 are exposed by making vias 28 through the encapsulant 22 (e.g., either with a laser, plasma etching, chemical etching, a drill or by photo-imaging and development or any other method known to one skilled in the art) (FIG. 6). The vias 28 within the encapsulant 22 are then filled with solder 30 (FIG. 7) which is forced into the holes by solder injection molding, solder jetting, screen printing solder paste, or other methods known to those skilled in the art. With any of these embodiments, the solder 30 is reflowed to form the electrical connection

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between the chip and the substrate while the encapsulant 22 bonds to the substrate 20 (usually with a polymer flux layer 23. See FIG. 13) and the chip 10 to form the structural connection. As can be easily appreciated by one of ordinary skill in the art, any of the above-described embodiments can be modified by precoating the substrate 20 (rather than the chip) with the encapsulant 22 or encapsulant 22 and solder 30 combination as shown in FIGS. 8 and 9, respectively.

B1 CONT.

On page 16 replace the paragraph that begins on line 5 with the following:

A preferred fluxing adhesive composition that has a lower curing temperature, faster curing rate and increased moisture resistance includes a fluxing agent that has the general structure R-COOH, wherein R comprises a moiety having two or more carbon-carbon double bonds, of which preferably at least one is within an acrylate or methacrylate moiety, that is, R contains at least one acrylate ($-C(O)CH=CH_2$) or methacrylate ($-C(O)C(CH_3)=CH_2$) group. (Preferably, there are 1 to 5 groups.) For high flux activity due to the presence of multiple carboxylic acids, a preferred fluxing agent is a carboxylic acid that is selected from the group consisting of compounds represented by Formulae IV, V, VI and mixtures thereof,

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$$HOOCCH=CH(O)COR^{18}OC(O)CH=CHCOOH \quad (IV)$$

$$R^{2}H_2C(HCOR^{n})_nCH_2OR^{3} \quad (V)$$

$$[Y^1Y^2Y^3Y^4]C \quad (VI)$$

where R^{18} is a substituted alkyl moiety containing at least one acrylate or methacrylate moiety and said substituted alkyl moiety comprising a chain having 1 to 16 carbons, preferably 1 to 9 carbons, and more preferably 1 to 3 carbons, and wherein n is an integer from 1 to 16, preferably an integer from 1 to 9, and more preferably an integer from 1 to 3, wherein each of R^1, R^2, ...R^n, is independently selected from $-C(O)CH=CHCOOH$, $-C(O)CH=CH_2$, $-C(O)C(CH_3)=CH_2$, and H, and wherein Y^1, Y^2, Y^3, and Y^4, are each independently selected from $-CH_2OH$, $-CH_2OCOCH=CH_2$, $-CH_2OCOC(CH_3)=CH_2$,

B2 CONT.

$-CH_2OC(O)CH=CHCOOH$ and H with the proviso that not all of Y^1, Y^2, Y^3, and Y^4 are H, and preferably not more than one of said Y^1, Y^2, Y^3, and Y^4 is H.

On pages 18 and 19 please replace the paragraph bridging these pages with the following:

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Another preferred fluxing-adhesive composition, one that has very high moisture resistance, comprises a fluxing agent with the general structure R-COOH, wherein R comprises a moiety having two or more carbon-carbon double bonds, of which preferably at least one is within an acrylate or methacrylate moiety and R further contains at least one aromatic moiety, which is an unsaturated aromatic carbocylic group having a single ring (e.g., phenyl) or multiple condensed rings (e.g., naphthyl) which condensed rings may or may not be aromatic. The aromatic moiety also includes substituted aromatic moieties. The R group can also be fluorinated. For high flux activity due to the presence of multiple carboxylic acids, the preferred fluxing agent is a carboxylic acid that is selected from the group consisting of compounds represented by Formulae VII and mixtures thereof. A particularly preferred aromatic-containing fluxing agent is one made from bisphenol A epoxy, as described in Example 1, which exhibits significant hydrophobicity.

Please cancel claims 1-6.

REMARKS

In the specification, the above replacement paragraphs include the following changes: (i) for page 12, line 8, delete the word "flax" and insert the word --flux— in place thereof; (ii) for page 16, line 7, delete "R COOH" and insert --R-COOH— in place thereof; and (iii) for page 18, line 27, delete "R COOH" and insert --R-COOH— in place thereof

Respectfully submitted,

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